

IN THE CLAIMS:

The status of each claim that has been introduced in the above-referenced application is identified in the ensuing listing of the claims. This listing of the claims replaces all previously submitted claims listings.

1. (Previously Presented) A slurry for use in polishing a copper structure of a semiconductor device, the slurry being substantially free of abrasives and comprising a plurality of components, including at least one oxidizer and at least one inhibitor, the plurality of components formulated to substantially concurrently polish copper and a barrier material comprising tungsten with the tungsten being removed at substantially the same rate as or at a slower rate than copper is removed.
2. (Previously Presented) The slurry of claim 1, wherein the plurality of components is formulated for use with a fixed-abrasive polishing pad comprising at least one of aluminum dioxide, titanium dioxide, silicon dioxide, and cerium dioxide.
3. (Previously Presented) The slurry of claim 1, wherein the plurality of components is formulated to oxidize copper at substantially the same rate as or at a faster rate than the barrier material is oxidized.
4. (Previously Presented) The slurry of claim 1, wherein, in the slurry, the barrier material and copper have substantially the same oxidation energies.
5. (Previously Presented) The slurry of claim 4, wherein, in the slurry, the barrier material has an oxidation energy of about 0.25 V more to about 0.20 V less than an oxidation energy of copper.
6. (Previously Presented) The slurry of claim 1, wherein, in the slurry, a rate of removal of the barrier material is up to about ten times slower than a rate of removal of copper.

7. (Previously Presented) The slurry of claim 1, wherein, in the slurry, a rate of removal of the barrier material is about two to about four times slower than a rate of removal of copper.

8. (Previously Presented) The slurry of claim 1, wherein the plurality of components of the slurry is formulated to remove copper and the barrier material without substantially dissolving the barrier material that underlies remaining portions of copper.

9. (Previously Presented) The slurry of claim 1, wherein the plurality of components of the slurry further includes at least one pH control agent.

10. (Previously Presented) The slurry of claim 1, wherein the at least one oxidizer comprises at least one of an ammonium compound, a nitrate compound, and an amine compound.

11. (Previously Presented) The slurry of claim 1, wherein the at least one oxidizer comprises at least one of hydrogen peroxide, potassium iodate, potassium permanganate, ammonium persulfate, ammonium molybdate, ferric nitrate, nitric acid, potassium nitrate, and ammonia.

12. (Previously Presented) The slurry of claim 1, wherein the at least one oxidizer comprises about 0.1% to about 20% of the weight of the slurry.

13. (Previously Presented) The slurry of claim 1, wherein the at least one oxidizer comprises about 0.1% to about 5% of the weight of the slurry.

14. (Previously Presented) The slurry of claim 9, wherein the at least one pH control agent comprises at least one of potassium hydrogen phthalate, ammonium acetate, ammonium oxalate, ammonium carbamate, ammonium phosphate, ammonium hydrogen phosphate,

ammonium dihydrogen phosphate, dibasic ammonium citrate, tribasic ammonium citrate, acetic acid, phosphoric acid, and sulfuric acid.

15. (Previously Presented) The slurry of claim 1, wherein the slurry has a pH of about 2 to about 6.

16. (Previously Presented) The slurry of claim 1, wherein the at least one inhibitor comprises at least one of an azole, an amine, and a ring compound.

17. (Previously Presented) The slurry of claim 1, wherein the at least one inhibitor comprises at least one of benzenetriazole (BTA), mercaptobenzothiazole, tolyltriazole, methylamine, diethylamine, pyridine, quinoline, dicyclohexamine nitrate, potassium silicate, ammonium borate, ammonium phosphate, and potassium dichromate.

18. (Previously Presented) The slurry of claim 1, wherein the at least one inhibitor comprises about 0.05% to about 2% of the weight of the slurry.

19. (Previously Presented) The slurry of claim 1, wherein the at least one inhibitor comprises about 0.05% to about 0.2% of the weight of the slurry.

20. (Previously Presented) The slurry of claim 1, wherein the plurality of components of the slurry further includes at least one complexing agent comprising at least one of glycine, ammonium citrate, ammonium phosphate, and ammonium acetate.

21. (Previously Presented) The slurry of claim 20, wherein the at least one complexing agent comprises about 2% to about 15% of the weight of the slurry.

22. (Previously Presented) The slurry of claim 20, wherein the at least one complexing agent comprises about 3% to about 5% of the weight of the slurry.

23. (Previously Presented) The slurry of claim 1, wherein the plurality of components of the slurry includes:

about 0.1% to 20% of the at least one oxidizer, by weight of the slurry; and
about 0.05% to about 2% of the at least one inhibitor, by weight of the slurry.

24. (Previously Presented) The slurry of claim 1, wherein the plurality of components of the slurry includes:

about 0.1% to about 5% of the at least one oxidizer, by weight of the slurry; and
about 0.05% to about 0.2% of the at least one inhibitor, by weight of the slurry.

25. (Previously Presented) The slurry of claim 1, wherein the plurality of components are formulated to remove copper at a temperature of about 27° C. or cooler.

26. (New) The slurry of claim 1, wherein the at least one oxidizer comprises potassium iodate and the at least one inhibitor comprises benzenetriazole, and further comprising a complexing agent, an oxidation energy of tungsten in the slurry being within an inclusive range of 0.25 V more than an oxidation energy of copper in the slurry to 0.20 V less than the oxidation energy of copper in the slurry.

27. (New) The slurry of claim 26, comprising about 3% to about 5%, by weight, potassium iodate.

28. (New) The slurry of claim 27, comprising about 0.1%, by weight, benzenetriazole.

29. (New) The slurry of claim 28, comprising about 0.1%, by weight, benzenetriazole.